



H32 Sudden Infant Death Syndrome (SIDS) and Tongue-Ties: Is There a Connection? Upper-Lip Frenum as a Predictive Marker for Unexpected and Unexplained Asphyxia in Infants

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After attending this presentation, attendees will better understand the research, anatomy, mechanism, logic, and evidence supporting a novel hypothesis for the cause of Unexpected Unexplained infant death by Asphyxia (UUA), also known as SIDS or Sudden Unexplained Infant Death Syndrome (SUIDS). Attendees will learn about a study published in 2016 that found a high and significant correlation between restricted lingual frenums (tongue-ties) and UUA. A brief overview of SIDS research to date will illustrate how this current study fits into the overall pattern. Pathologists and medical examiners will learn what to look for to help decide how to pronounce on these perplexing cases as well as what they can do to aid in future research in this area.

This presentation will impact the forensic science community by providing information about a new theory of causation for (or contribution to) UUA, SIDS, or SUIDS. Identifying a restricted upper-lip frenum could provide an additional piece of useful information when analyzing these difficult cases to determine cause of death. In cases in which a restricted upper-lip frenum exists, there is now another possible explanation for asphyxia to consider in addition to mechanical overlay. If a tongue-tie is suspected, inquiries can be made into the medical history of the infant with respect to untreated tongue-tie, reflux, gas, and success or failure of breastfeeding. These results support the need for further research into this theory of causation. It may also provide pediatricians with a practical tool for identifying infants at possible risk for UUA/SIDS.

Hypothesis: There is a correlation between tongue-tie (ankyloglossia) and UUA that is predictive of risk and may be causal.

Synopsis: The demographics of tongue-ties and SIDS have several things in common: both occur more in boys than girls at the ratio of 3:1, they occur in approximately 5% of the population, and they can run in families. Because tongue-ties limit tongue movement, they often interfere with an infant's ability to breastfeed. Successful breastfeeding has been shown to correlate with a reduced risk for SIDS. Rather than successful breastfeeding being protective against SIDS, perhaps it is the case that infants with an inability to breastfeed because of a tongue-tie may be at higher risk for SIDS. To investigate this possibility, this study investigated whether wanted to see if SIDS/UUA infants do, indeed, have a higher frequency of tongue-ties than the general population.

A retrospective review of 327 cases of UUA under one year of age was conducted. Cases were included if their official cause of death was SIIDS, SUIDS, unknown, undetermined, co-sleeping, probable overlay, Asphyxia or Accidental Suffocation and Strangulation in Bed (ASSB). Cases of probable overlay were included because this is often only suspected rather than proven. Upper-lip frenums were used as a proxy for tongue-ties because: (1) when an upper-lip tie is present, 99% of the time there is also a restricted tongue as well; and, (2) upper-lip frenum restriction is more reliably diagnosed, even in death. Using autopsy photos, upper-lip frenums were classified as restricted or not restricted. The occurrence of tongue-ties in the general population is generally accepted to be approximately 5%. If there were no connection between tongue-ties and UUA, one would expect to find the same 5% of restricted upper-lip frenums in the UUA population. It was found that 84% were restricted. This finding is



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statistically significant at the 99% confidence level. The use of upper-lip frenum restriction as a proxy for tongue-ties would tend to bias this study toward a rejection of the hypothesis since not all tongue-ties have an associated upper-lip frenum restriction. These results proved significant nonetheless.

Results: While a correlation does not prove causality, it is significant that 84% of the UUA cases had restricted upper-lip ties as compared with 5% incidence for the general population.

Conclusion: There is a strong statistically significant correlation between restricted upper-lip frenums (and, by proxy, tongue-ties) and cases of unexpected and unexplained infant death. This supports further research into this causal mechanism that relates restricted lingual frenums to UUA. Also, clinical findings of restricted upper-lip frenums may be useful for pediatricians to identify infants at possible risk for UUA/SIDS.

SIDS, SUIDS, Tongue-Tie